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Prevalence of Calcaneal Spur in Adult Nepalese in Ankle Joint's Radiographs in a Tertiary Hospital of Nepal

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ABSTRACT

Background

Calcaneal spur is a bony outgrowth occurring at the site of plantar fascia insertion or dorsal tendon insertion into the calcaneum and may induce heel pain or remain painless. Several studies shows it's occurrence depends upon various factors like age, gender, occupation, footwear, ethnicity, and obesity. This study aimed to detect the prevalence of calcaneal spur and its types in the study population and to assess the association of spur with age, gender, profession, body mass index, and symptoms.

Methods

This descriptive cross-sectional study was conducted in 572 patients from October 2024 to September 2025. Data were collected after evaluation of ankle joint radiographs (lateral view). Mean value and standard deviation were calculated for continuous variables. Similarly, categorical variables were presented as frequency and percentage. The level of signification was kept at $p<0.05$.The association between presence of spur and patient's age, sex, profession, Body Mass Index, and symptoms were assessed using chi-square test.

Results

The prevalence of spur was 251 (43.90%) (39.80-48.00 at 95% CI). The most prevalent was planter spur 122 (48.60%) (39.70-57.50 at 95% CI). Among different professionals, spur was more 96 (38.20%) in housewife. Spur was common among the older patient with low height, and higher Body Mass Index.

Conclusions

This study shows significant high prevalence of spur in females than in male and concludes significant association of spur with age, height, BMI and profession. No significant association of spur was observe with weight and symptoms.

Keywords: Ankle joint's radiograph; Calcaneal spur; Prevalence.

Correspondence: Mr. Ramswarth Sah, Department of Radiology, Tribhuvan University Teaching Hospital, Maharajgunj, Kathmandu, Nepal. Email: npshahiom@gmail.com, Phone: +977-9841380084 **Article received**: 2025-12-20. **Article accepted**: 2026-03-05. **Article published**: 2026-03-31.

INTRODUCTION

Calcaneum is the largest and strongest among the seven tarsal bones.[1,2] Calcaneal spur is a bony outgrowth occurring at the site of plantar fascia insertion or dorsal tendon insertion into the calcaneum and it's size differs from person to person.[3] It may induce heel pain or remain painless.[4] Several studies regarding the prevalence of calcaneal spur have found that the occurrence of the spur depends upon various factors like age, gender, occupation, footwear, ethnicity and obesity.[4-8] Calcaneal spurs are common in older (both male and female) and are related to obesity, osteoarthritis and current or previous heel pain, but are unrelated to foot posture.[9,10]

Also, a study performed at the trauma clinic of the University Hospital of Wales has recommended for a study to collect patient's clinical findings and symptoms in correlation with spurs prevalence.[6] In this regard, there is lack of published data in Nepal. Thus, this study aimed to detect the prevalence of calcaneal spur and it's types as well as to assess its association with age, gender, profession, body mass index and symptoms.

METHODS

This study was an observational, descriptive, and cross-sectional study. All the adult patients (18 years old or older) referred from physicians (orthopaedics doctors and other clinicians) for radiographic examination of ankle joint (lateral projection of ankle join or both antero-posterior projection and lateral projection of ankle joint) in the Department of Radiology and Imaging, Tribhuvan University Teaching Hospital (TUTH) were the study population. This study was conducted in the Department of Radiology and Imaging, Tribhuvan University Teaching Hospital, Kathmanu, Nepal between October 22, 2024 and September 21, 2025 after taking ethical approval from the Institutional Review Committee (IRC), Institute of Medicine (IOM), Tribhuvan University, (Ref.No-: 252/081/082(6-11) E2).

All the patients (572) referred from orthopaedics doctors and other clinicians for radiographic examination of ankle joint (lateral projection of ankle joint or both anterior-posterior projection and lateral projection of ankle joint) in the Department of Radiology and Imaging, TUTH, following under inclusion criteria were used in the study. However, the patient's images with calcaneum bone fracture or not true lateral radiographs were excluded from the study. Radiographs of the patients with the history of trauma or fall injury were also excluded from the study. A total of five hundred seventy two patients were included in this study using total population sampling (images of all the patients meeting the inclusion criteria) during the study period.

All the patients were explained about their radiographic examination, and written consents were taken from them. After taking the required history regarding clinical symptoms, including demographic parameters, their height and weight were measured using digital weighing machine and stadiometer. The radiographic examination of all the patients were performed using x-ray machine, Shimadzu Corporation X-ray tube and an image receptor with advanced i-ray software, digital radiography (DR) system. After Completion of radiographic examination, all the radiographic images falling under inclusion criteria were randomly reviewed on computer monitor. The image was identified as true lateral if the anterior half of the distal fibula was superimposed by posterior half of the distal tibia. However, the patient's images with calcaneum bone fracture or not true lateral radiographs were excluded from the study. Radiographs of the patients with the history of trauma or fall injury were also excluded from the study. Presence of the spur was considered if there was a prominent peak or any alteration to normal surface contour of the calcaneum at the dorsal or plantar enthesis or at both beyond the normal cortical margin (projection more than two millimetres from the normal calcaneal contour were used objective cut-off). Presence of the spur was ensured by one of the radiologist from the department of radiology and imaging, TUTH. Type of the spur was noted according to the site of

its presence. A prominent peak seen at the plantar insertion was noted as plantar spur while that present at dorsal insertion was noted as dorsal spur. The patient's images illustrating prominent peak at both the plantar insertion as well as at the dorsal insertion was noted as presence of both types of spur.

All the relevant data were collected in a self and pre-designed pro-forma and data were entered into the Microsoft Excel Worksheet and were transferred to the Statistical Package for Social Science (SPSS) program. Statistical analyses were carried out using IBM SPSS version 16 (IBM Corp., Armonk, NY, USA). Mean value and standard deviation (SD) were used for descriptive Statistics and categorical variable were presented as frequency and percentage. The level of signification was kept at $p<0.05$.The association between presence of spur and patient's age, weight, height, and BMI were assessed by Pearson's Correlation Coefficient and association of spurs prevalence with gender, professions, and symptoms were assessed using chi-square test.

RESULTS

Among 572 participants included in the study, 258 (45.10%) were males and 314 (54.90%) were females. Age of the patients ranged from 18 years to 80 years, with a mean age 44.44±14.27 years. Similarly, the mean height, weight, and BMI of the patients were 1.58±0.10 m (range 0.99-2.16 m), 65.05±10.85 Kg (range 23.00-103.00 Kg), and 25.76±4.64 Kg/m^2 (range 11.36-61.22 Kg/m^2), respectively. The prevalence of spur was 251 (43.90%) (39.80-48.00 at 95% CI). Among all the spurs, the planter spur was common, 122 (48.60%) (39.70-57.50 at 95% CI), and the dorsal spur was the not common, found in 59 (23.60%) (18.40-28.90 at 95% CI). Spur was observed more frequent in female, 170 (67.73%) (61.95-73.51 at 95 CI) in comparison to that of the male, 81 (32.27%) (26.49-38.05 at 95% CI), and planter spur was the common in female, 95 (55.88%) (47.10-64.70 at 95% CI) while the presence of both spurs (planter and dorsal spurs) was found only 29 (35.80%) (25.40-46.20 at 95% CI) in the male. The difference in the prevalence of calcaneal spur between male and female was significant, (Chi-square value (χ^2) = 29.75, likelihood ratio = 30.16 and p-value = 0.00) (Table 1).

Table 1. Genderwise distribution of types of calcaneal spurs (n=251).

Sex	Planter spur n (%)	Dorsal spur n (%)	Both spur n (%)
Male	27 (33.34)	25 (30.86)	29 (35.80)
Female	95 (55.88)	34 (20.00)	41 (24.12)
Overall (n=251)	122 (48.60)	59 (23.51)	70 (27.89)

The distribution of calcaneal spurs was found significantly correlated with age (r=0.314 and p-value < 0.01), and it was found more common 80 out of 251 (31.88%) in the patients having age range 51-60 years. Similarly, presence of calcaneal spurs was also observed significantly correlated with BMI of the patients (r=0.21 and p-value<0.01) and it was found more prevalent 152 among 251 (60.56%) in overweight and obese patients (BMI 25 or more Kg/m^2). There was a significant negative correlation between prevalence of spurs with height of the patients (r= -1.80 and p-value<0.01), and it was more common 107 out of 251 (42.63%) among the patients with height 150-160 cm. But, no significant correlation between spurs with weight of the patients was found (r = 0.03 and p-value = 0.55), though it was common in the patients having weight 60 Kg or more (Table 2).

Table 2. Characteristics of the study population with spurs (n=251).

Variable 1 (Age in year)	Patient's number	Calcaneal spur n (%)
≤20	22	1 (0.39)
21-30	87	10 (3.98)
31-40	139	55 (21.91)
41-50	119	65 (25.89)
51-60	129	80 (31.88)
≥61	76	40 (15.95)
Variable 2 (Height in cm)		
<150	68	37 (14.74)
150-160	213	107 (42.63)
160-170	206	84 (33.47)

≥170	85	23 (9.16)
Variable 3 (Weight in Kg)		
<50	50	22 (8.76)
50-60	154	69 (27.49)
60-70	200	80 (31.87)
≥70	168	80 (31.87)
Variable 4 (BMI in Kg/m²)		
<18.5	22	7 (2.79)
18.5-25	246	92 (36.65)

cm=Centimetre; Kg=Kilogram; m=Meter; BMI=Body Mass Index

Seven different professions were observed (after grouping the similar professional, based on physical activities, in the same group) among the 251 participants with either type of calcaneal spur. The prevalence of calcaneal spur was found the highest in housewife 96 out of 251 (38.20%) followed by farmer, 67 among 251 (26.70%). The third more common profession with calcaneal spur was bussinessman, 29 cases (11.60%), followed by teacher, 28 cases (11.20%). Similarly, spur was found only in 6 (2.40%) driver and in 6 (2.40%) police/army (Table 3). There were 42 students in the study population, but none of them was found with any types of spur. Also, significant association of calcaneal spur distribution were found in different profession (Chi-square value (χ^2) = 56.70, likelihood ratio=72.40 and p-value<0.001). Regarding symptoms and presence of calcaneal spur, 153 (60.96%) participants with calcaneal spur were found with pain over either ankle joint or heel or both, followed by 61 (24.30%) case without pain. Only 37 (14.74%) cases with calcaneal spur were found with both pain and swelling over ankle joint (Figure 1). Though, no significant association was found between presence of spur and symptoms (Chi-square value (χ^2) = 3.03, likelihood ratio 3.05 and p-value=0.22).

Table 3. Profession wise distribution of types of calcaneal spur in the study population (n=251).

Professionals with spur	Planter spur n (%)	Dorsal spur n (%)	Both spur n (%)
Housewife	45 (46.87)	22 (22.92)	29 (30.21)
Farmer	39 (58.21)	14 (20.89)	14 (20.89)
Bussinessman	10 (34.48)	9 (31.03)	10 (34.50)
Teacher	16 (57.14)	4 (14.28)	8 (28.57)
Addministrative and Health worker	6 (31.58)	7 (36.84)	6 (31.58)
Police/Army	1 (16.67)	2 (33.33)	3 (50.00)
Driver/Tailor	5 (83.33)	1 (16.67)	0 (0.00)

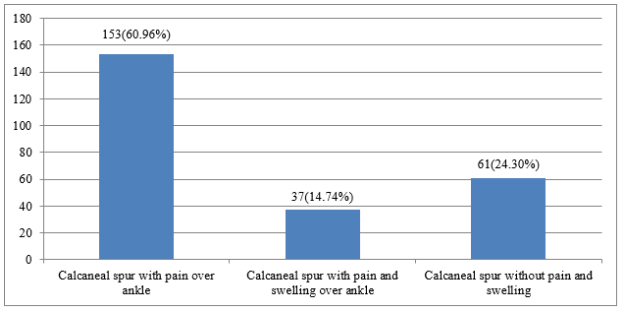

Figure 1. Symptom wise distribution of calcaneal spurs in the study population (n=251).

DISCUSSION

Calcaneal spur, which is formed on the plantar and posterior sides of the heel, are often linked to conditions like plantar fasciitis and dorsal tendinitis, though, this association is not always true, as some individuals with spurs may not exhibit any clinical symptoms.[11] Knowledge regarding calcaneal spur prevalence and it's associated factors is vital for understanding heel pain, improving preventative care, and guiding treatment plans for conditions like plantar fasciitis.[12] Knowing the association between risk factors like obesity, age, and occupation helps for the development of public health campaigns and required interventions to reduce the incidence of calcaneal spurs and associated pain. Calcaneal spurs mainly affect older adults, individuals with obesity, osteoarthritis, and those with heel pain.[13]

Our study showed overall calcaneal spur prevalence 251(43.90%) (39.80-48.00 at 95% CI) which is slightly higher than that found (34.70%) in the similar studies by Emmanuel Fiagbedzi, Nana Ofori, Jeffrey Gameli Amlalo in Ghana and 38% found by *Toumi H, Davies R, Mazor M, et al.,* at University Hospital of Wales.[6,13] Similarly, a similar

study by Kullar J, Randhawa G, Kullar K. in India, found the spur only in 26.50%.[3] Likewise, Beytemur O, Oncu M. reported spur prevalence only 33% in the Turkish population.[7] This difference in the spur prevalence may be due to difference in ethnicity, physical activities, and geographic location. In our study, prevalence of spur was found significantly higher in female than in male ($p<0.001$) and planter spur was the most common, 48.60% (33.34% in male and 55.88% in female). These results have been supported by several similar studies performed.[4,6,13,14] However, in a similar study by Kullar J, Randhawa G, Kullar K. in India, reported dorsal spur as the most common.[3] The higher prevalence of spurs in females may be linked with the wearing of high-heeled shoes that can intensify the impact on the heel during walking, altering foot biomechanics. These changes at the insertion points of the plantar fascia and Achilles tendon may contribute to the formation of spurs.[15] In our study, prevalence of spur was found significantly higher in age group 50-61 years and patients with overweight and obese (BMI 25 Kg/m^2 or more). Our study also, found a statistically significant association between calcaneal spur and age, height, BMI. This result has been supported by various studies performed abroad.[4,6,7,13,14] In our study, prevalence of spur was found significantly higher in housewife (38.25%) followed by farmer/labour worker (26.69%). Prolonged period of standing is also a contributing factor to spur development. [12] Regarding pain and presence of calcaneal spur, 153 (60.96%) cases with calcaneal spur were found with pain over either ankle join or heel or both, followed by 61 (24.30%) case without pain, though, prevalence of spur was not found significantly associated with pain in our study. But, Cho BW, Choi JH, Han HS, Choi WY, Lee KM found size of spur significantly correlated with pain.[12]

CONCLUSIONS

This study demonstrates a high overall prevalence of calcaneal spurs (43.90%), with plantar spurs being the most commonly observed type. The prevalence of spurs is significantly higher in females compared to males. A significant association is observed between the presence of calcaneal spurs and demographic as well as anthropometric factors, including age, height, body mass index, and profession. However, no significant association is identified between calcaneal spurs and heel pain.

Limitations

The single-centre design and relatively small sample size may not fully represent Nepal's diverse population. Our findings may not represent all the ethnic groups because its influence was not considered in this study. Similarly, size of the spur was not considered in this study. Therefore, multicentre studies with a larger sample size considering different ethnic groups and size of spur offer more comprehensive data, enhancing the understanding of prevalence of calcaneal spur and its associated factors in the Nepalese population.

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Conflict of Interest; The authors declare that they have no conflict of interest.

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Availability of data and materials: All data analysed during this study will be made available upon reasonable request from the corresponding author.

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